CLAIMS

What is claimed is:

1. A 3D camera system capable of generating a 3D image of an object from 3D input pictures of the object.

2. A 3D camera system for generating a 3D image of an object from 3D input pictures of the object, comprising:

at least one camera;

a moving platform on which the at least one camera is adjustably mounted;

a signal generator operable with the moving platform for generating a plurality of trigger signals for camera exposure to take the 3D input pictures of the object at predetermined locations at precise intervals; and

an image processor for processing the 3D input pictures to generate the 3D image of the object.

3. The 3D camera system of claim 2, wherein the signal generator comprises a photo detector mounted on the moving platform, and a fan-shaped grating sheet on which the moving platform is moved to produce the trigger signals for camera exposure to take the 3D input pictures of the object at the predetermined locations at the precise intervals.

4. The 3D camera system of claim 3, wherein the moving platform includes a set of wheels that are movable along a path on the fan-shaped grating sheet, wherein the path is generally perpendicular to a plurality of dark lines on the fan-shaped grating sheet, an axle of each wheel is parallel to one of the plurality of dark lines, and upon moving the photo detector along the path, the photo detector detects the dark lines so as to generate the plurality of trigger signals for triggering the camera to take the 3D input pictures of the object.

5. The 3D camera system of claim 2, wherein the signal generator comprises an optical encoder and a programmable divider mounted on the moving platform, and upon moving the moving platform, to trigger the camera at programmable precise intervals.

6. The 3D camera system of claim 5, further comprising a stepper motor mounted on the moving platform to move the camera to the predetermined locations.

7. The 3D camera system of claim 6, wherein the moving platform includes a set of wheels, the optical encoder is mounted on one of the wheels, and upon moving the wheels, the encoder and programmable divider generate the plurality of trigger signals for triggering the camera to take the 3D input pictures of the object.

8. The 3D camera system of claim 6, wherein the moving platform includes a set of wheels, the optical encoder is mounted on one of the wheels, and upon moving the wheels, the encoder and divider generate the plurality of trigger signals for triggering the camera to take the 3D input pictures of the object and for controlling the stepper motor.

9. The 3D camera system of claim 3, wherein the moving platform is moved manually by a user, wherein the signal generated by the photo detector includes a sound feedback whereby the camera system can be stopped manually by the user.

10. The 3D camera system of claim 4, wherein the camera is operated in a time lapsed mode, whereby the camera moves along the path while taking the 3D input pictures continuously.

11. The 3D camera system of claim 2, wherein two cameras are mounted on two separable pieces of the moving platform, respectively, the two separable pieces of the moving platform being joined by a stretchable linkage, such that the two cameras can be

adjusted at a desired position to ensure that an optical axis of each of the two cameras focuses on the same center of interest of the object.

12. The 3D camera system of claim 11, wherein the stretchable linkage is capable of adjusting an optical angle of the two cameras relative to the center of interest of the object.

13. The 3D camera system of claim 11, wherein the stretchable linkage is capable of adjusting a distance between the two cameras.

14. A system of constructing a 3D image of a moving 3D object, comprising:

two cameras;

a moving platform having two separable pieces on which the two cameras are adjustably mounted, respectively;

a signal generator operable with the moving platform for generating a plurality of trigger signals for camera exposure to take 3D pictures of the moving 3D object at predetermined locations at precise intervals; and

an image processor for processing the 3D pictures to generate the 3D image of the moving 3D object.

15. The system of claim 14, wherein at each point in a time sequence, the pictures taken from the two cameras are captured simultaneously, representing multiple time sequenced left eye and right eye views, whereby each captured pair can be viewed by left eye and right eye simultaneously via a lenticular lens/barrier viewing screen, so that human eyes can see stereo-pair images.

16. The system of claim 14, wherein the signal generator comprises a photo detector mounted on the moving platform, and a fan-shaped grating sheet on which the moving

platform is moved to produce the trigger signals for camera exposure to take the 3D input pictures of the object at the predetermined locations at the precise intervals.

17. The system of claim 16, wherein the moving platform includes a set of wheels that are movable along a path on the fan-shaped grating sheet, wherein the path is generally perpendicular to a plurality of dark lines on the fan-shaped grating sheet, an axle of each wheel is parallel to one of the plurality of dark lines, and upon moving the photo detector along the path, the photo detector detects the dark lines so as to generate the plurality of trigger signals for triggering the cameras to take the 3D input pictures of the moving 3D object.

18. The system of claim 14, wherein the signal generator comprises an optical encoder and a programmable divider mounted on the moving platform, and upon moving the moving platform, to trigger the cameras at programmable precise intervals.

19. The system of claim 18, further comprising a stepper motor mounted on the moving platform to move the cameras to the predetermined locations.

20. The system of claim 19, wherein the moving platform includes a set of wheels, the optical encoder is mounted on one of the wheels, and upon moving the wheels, the encoder and programmable divider generate the plurality of trigger signals for triggering the cameras to take the 3D input pictures of the moving 3D object.

21. The system of claim 19, wherein the moving platform includes a set of wheels, the optical encoder is mounted on one of the wheels, and upon moving the wheels, the plurality of trigger signals are generated for triggering the cameras to take the 3D pictures of the moving 3D object and for controlling the stepper motor.

22. The system of claim 16, wherein the moving platform is moved manually by a user, wherein the signal generated by the photo detector includes a sound feedback whereby the camera system can be stopped manually by the user.

23. The system of claim 17, wherein the cameras are operated in a time lapsed mode, whereby the cameras move along the path while taking the 3D pictures continuously.

24. The system of claim 14, wherein the two separable pieces of the moving platform are joined by a stretchable linkage, such that the two cameras can be adjusted at a desired position to ensure that an optical axis of each of the two cameras is aligned parallel to and centered over the axle of the set of the wheels and focuses on the same center of interest of the moving 3D object.

25. The system of claim 24, wherein the stretchable linkage is capable of adjusting an optical angle of the two cameras relative to the center of interest of the moving 3D object.

26. The system of claim 24, wherein the stretchable linkage is capable of adjusting a distance between the two cameras.

27. A signal generator for generating a plurality of trigger signals for camera exposure, comprising:

a photo detector; and

a fan-shaped grating sheet on which the photo detector is moved to produce the trigger signals for camera exposure to take 3D pictures of an object at predetermined locations at intervals;

wherein the photo detector is movable along a path on the fan-shaped grating sheet, wherein the path is generally perpendicular to a plurality of dark lines on the fan-shaped grating sheet, and upon moving the photo detector along the path, the photo

detector detects the dark lines so as to generate the trigger signals for triggering a camera to take the 3D pictures of the object.

28. A fan-shaped grating sheet operable with a photo detector to generate a plurality of trigger signals for camera exposure of an object by a camera, comprising:

a plurality of fan-shaped dark grating lines, each line pointing to a common center point;

a plurality of distance lines generally perpendicular to the grating lines, each of the distance lines representing a distance from the object to the camera, wherein upon moving the photo detector along one of the distance lines, the photo detector detects the grating lines so as to generate the trigger signals for triggering the camera to take 3D pictures of the object.

29. A camera trigger circuit for controllably triggering operation of a moving camera of a 3D camera system which generates a 3D image of an object from 3D pictures of the object, comprising:

a position sensor for detecting positions where the 3D pictures of the object are taken along a path of the moving camera; and

a camera pre-focus/shutter trigger pulse generator for generating a pulse for pre-focusing the moving camera before triggering shutter of the moving camera.

30. The circuit of claim 29, wherein the position sensor comprises a photo detector and a fan-shaped grating sheet on which the photo detector is moved.

31. The circuit of claim 29, wherein the position sensor comprises an optical encoder and a programmable divider to move the moving camera at intervals.

32. The circuit of claim 31, further comprising a stepper motor to move the moving camera to predetermined locations.